

CHAPTER 1

PURPOSE AND OVERVIEW

1.1 Introduction

Chapter 1 gives the purpose of this manual and an overview of the standards for stormwater management in Fayette County. Three concepts, the public drainage system, the waters of Fayette County, and post-development floodplains are important to the management of stormwater and are discussed in this chapter. The chapter also includes several general criteria required for the management of stormwater in new development. Finally, the chapter includes a summary of the specific criteria for managing water quantity and water quality. Many of the criteria presented in Chapter 1 are discussed in more detail in later chapters.

The manual is applicable to all stormwater infrastructure owned or regulated by the Lexington-Fayette Urban County Government (LFUCG). This includes infrastructure on commercial and industrial property. The only stormwater infrastructure not covered by the manual is farm facilities used for agricultural purposes.

1.2 Purpose

The regulated stormwater in Fayette County lies on both public and private property. Portions of the stormwater infrastructure are constructed through the LFUCG capital improvement projects and portions are constructed through private residential, commercial, and industrial development. In many cases, the LFUCG may ultimately become the owner of the stormwater infrastructure constructed by private development. To responsibly regulate the stormwater infrastructure, a consistent quality of construction is necessary regardless of the entity financing and managing the construction.

The purpose of this manual is to provide standards to assure quality in the design and construction of stormwater infrastructure that becomes a part of that owned or regulated by the LFUCG by providing standard design criteria to the engineers who design the infrastructure. The manual establishes uniformity in design assumptions and general methods of design. The manual also sets policy regarding design standards and specifications and provides for uniform interpretation of the specifications. Finally, the manual outlines the required calculations and design details applicable to all stormwater infrastructure.

This manual draws heavily on technical information and design criteria used in numerous city and state manuals and is thus similar in many instances to those manuals. However, this manual has been tailored to fit Lexington and Fayette County and contains important provisions that are unique to this area.

The manual includes requirements for the stormwater infrastructure that is routinely designed and constructed, including rational engineering principles and practices. However, more comprehensive methods of analysis and design may be required for unusual conditions not specifically covered in this manual or where otherwise appropriate from an engineering standpoint to assure public safety and quality in infrastructure design and construction.

1.3 Definitions

1.3.1 Public Drainage System

The public drainage system for subdivided property shall begin at the point where the water from more than two lots combine, or where water from one lot combines with water from a public road or other public facility. The public drainage system may be located on either public or private property. This definition of the public drainage system applies to areas covered by infrastructure plans submitted after January 1, 2001.

The public drainage system is divided into two parts: the constructed part and the natural part. The constructed part includes those pipes, overland flow channels, swales, etc., which carry water from the beginning of the public drainage system to the portion of the drainage system that remains undisturbed, the natural portion. The natural portion of the public drainage system is referred to as the waters of Fayette County as defined below.

An adequate drainage right of way shall be required for all of the public drainage system not already in a street right of way. The right of way shall be of sufficient width to allow cleaning, widening, deepening, replacing, and generally maintaining the public drainage system. For areas covered by plans reviewed before the effective date of these procedures, the LFUCG may assume equivalent rights of way by agreement or condemnation. In general, the government will add these older areas to the public drainage system if they meet the same standards required by this manual. The minimum width of the drainage right of way shall be 20 feet.

The drainage right of way shall be treated the same as the street right of way. Like the area between the curb and the back of the sidewalk, property owners adjacent to the drainage right-of way will have certain maintenance responsibilities such as mowing.

1.3.2 Waters of Fayette County

The waters of Fayette County are the natural portion of the public drainage system that shall remain undisturbed. The waters of Fayette County are those shown on the Fayette County GIS waters coverage. These include:

- intermittent and perennial streams represented on the USGS 7.5 minute topographic maps as either solid or dashed blue line streams; channels that are not shown as a solid or dashed blue line shall be considered a stream if they have a drainage area of at least 50 acres
- other channels which may be added because they display a nature similar to those designated as a blue line on the USGS maps
- reservoirs, lakes, farm ponds, and other impoundments on the streams, or in many cases which are the beginning of the stream
- wetlands with areas of more than ½ acre according to the current wetland delineation criteria used by the U. S. Army Corps of Engineers and a buffer area of 25 feet around the wetland; known wetlands are shown on the Fayette County GIS wetlands coverage

- groundwater flowing in the soil and rock formations beneath Fayette County
- a vegetative buffer strip extending 25 feet horizontally from the top of bank elevation for perennial streams, and 25 feet from the centerline of intermittent streams
- post-development floodplains
- greenways along streams on the LFUCG Greenway Masterplan

1.3.3 Post Development Floodplain

The post-development floodplain for waters of Fayette County is the portion of land adjacent to a stream (as defined above) covered with water during the 100-year, 24-hour storm. It shall be determined using the procedures outlined in Chapter 3 of this manual. The post-development floodplain shall be based on a fully developed watershed and shall be used to determine the flood protection elevation for structures.

1.3.4 Soils Floodplain

The soils floodplain has been used in Fayette County to establish approximate floodplain boundaries where detailed hydrologic and hydraulic calculations have not been performed. The soils floodplain consists of the alluvial soils listed below as defined by the U.S. Department of Agriculture Natural Resources Conservation Service:

- Armour Silt Loam - ArA – Only if adjacent to a stream or other alluvial soil
- Armour Silt Loam - ArB and Arc – Only along the Kentucky River
- Captina Silt Loam - CaA
- Captina Silt Loam - CaB
- Egam Silt Loam - Ea
- Egam Silt Clay Loam - Ec
- Huntington Silt Loam - Hu
- Lanton Silt Loam - La
- Lawrence Silt Loam - Lc
- Linside Silt Loam - Ld
- Melvin Silt Loam - Mt
- Newark Silt Loam - Ne

Some soils floodplains exist along streams that have a FEMA floodplain or post-development floodplain where detailed hydrologic and hydraulic calculations have been performed. In this case, the FEMA floodplain and post-development floodplain shall take precedence over the soils floodplain.

Some soils floodplains exist along streams or low-lying areas that do not have a FEMA floodplain or post-development floodplain and where detailed hydrologic and hydraulic calculations have not been performed. In this case, a structure can be constructed in the soils floodplain if

- the Division of Engineering determines that the proposed structure will not flood for the 100-year storm, will not create a drainage problem, and will not aggravate an existing problem
- a foundation design, stamped by a professional engineer licensed in Kentucky, is submitted as part of the application for a building permit to the Division of Building Inspection

1.4 General Criteria for New Development

1.4.1 Watershed Studies

Watershed studies are necessary to evaluate the impacts of a given development on the public drainage system and to define the post-development floodplain. The criteria for conducting watershed studies are given in Chapter 3.

The LFUCG has a program for inventorying the stormwater system, collecting physical and chemical data describing the waters, and developing watershed models. The program also includes collecting information on the physical nature of the stream or channel, detail of the natural vegetation in the floodplain, the riparian vegetation, the nature and extent of any unique features like wetlands, and the biological community in the water.

In watersheds where the models are completed, the LFUCG shall define the post development floodplain and set the other stormwater criteria for the development. In areas where the models are not completed, the LFUCG may require the Developer to conduct the study.

1.4.2 Regional Stormwater Management

The LFUCG shall require regional stormwater management facilities when practicable. This is more cost effective than requiring each small development project to construct its own stormwater facilities. In addition, the long-term maintenance requirements will be less because there will be fewer of these small facilities to maintain.

The LFUCG may require two or more developers to jointly fund the construction of a common water quality and/or water quantity practice by requiring cooperation between the developers or using a fee-in-lieu of constructing stormwater BMPs as defined later in this chapter.

1.4.3 Existing Stormwater Master Plans

Expansion Area 2

The regional stormwater master plan for Expansion Area 2 is contained in a report prepared by Commonwealth Technology, Inc. entitled “Preliminary Engineering Report – Stormwater Management in Expansion Area 2.” This report can be obtained from the Division of Engineering. The report contains the location and size of stormwater management structures to control flooding and to protect water quality.

Stormwater Master Plans Prepared by Developers

The following developments currently have a regional stormwater master plan to control flooding:

- Beaumont Centre
- Coldstream
- Hamburg
- Reynolds Road

- Masterson Station

Watershed hydrologic models have been constructed for these areas. The Division of Engineering will continue to work with the Developer's Engineer to ensure that off-site flooding impacts are evaluated. The objective will be to maintain the capacity of the drainage system, minimize the impact to existing flooding problems, and protect the stream water quality from construction activities.

1.4.4 Construction in the Waters of Fayette County

In general, construction activities shall not be allowed in the waters or post-development floodplains of Fayette County. Filling the floodplain to allow more land to be developed shall be prohibited. Excavation in the floodplain to lower flood levels shall not be permitted. Only the following activities shall be undertaken in the waters or post-development floodplains

- temporary sediment ponds that will be converted to a permanent stormwater management pond
- roadways and utilities that cross at angles within 10 degrees of being perpendicular to the stream or floodplain
- sanitary sewers, constructed outside the horizontal limits of the 10-year post-development floodplain, with manhole covers set at an elevation one foot higher than the 100-year post-development floodplain, using the procedures described in Chapter 3 of this manual; surface fill may not be placed in the floodplain to cover a sanitary sewer; any excess material from excavation of the sewer must be removed from the post-development floodplain
- storm sewer pipe outlets where the outlet terminates at the edge of the post-development floodplain
- regional flood control or water quality control ponds constructed by the LFUCG
- other flood control practices that do not disturb below the normal top of bank of the stream
- water quality practices that do not disturb below the normal top of bank of the stream
- pedestrian crossings and trails

If situations arise where there are no feasible alternatives to construction in a water or floodplain, the construction will only be allowed if the water or floodplain can be enhanced in the area of construction or if enhancement work is done on another water as mitigation.

1.4.5 Mitigation

It is the intent of the LFUCG to ensure that impacts to streams and wetlands are mitigated. Some impacts are regulated by the U.S. Army Corps of Engineers (COE) and the Kentucky Division of Water (KDOW) and require mitigation plans to be approved by those agencies. In those cases, the mitigation plans approved by the COE and the KDOW will satisfy the requirements of this section if the mitigation takes place in Fayette County. For stream impacts in the Jacobson Reservoir Watershed and the Royal Springs Aquifer, every effort shall be made to keep the mitigation within those watersheds.

In cases where neither the COE nor the KDOW regulate a stream or wetland impact, the following mitigation guidelines shall be followed:

Fills Along a Stream > 200 Feet

Fill for road crossings and embankments shall be mitigated by establishing a riparian buffer zone on each side of the stream for a length equal to the width of the post-development floodplain.

Stream Relocations > 200 Feet

The relocated stream shall be designed to:

- restore the geomorphic function, including the meandering pattern
- include measures to enhance aquatic habitat
- use natural or bioengineering techniques to stabilize banks
- include a minimum 25 foot vegetative buffer strip on each side

Wetlands > 0.5 acre

Mitigation shall take the form of creating another wetland at a ratio of 1:1, or obtaining credits in a LFUCG wetland bank.

1.4.6 Ownership of Stormwater Facilities

For Improvement Plans submitted on or after January 1, 2001, the LFUCG shall own and maintain the facilities listed below in single family residential and two family residential developments:

- Dry Detention Ponds
- Wet Detention Ponds
- Extended Detention Ponds
- Infiltration Basins
- Constructed Wetlands

These facilities shall be on a separate lot with adequate access for maintenance and dedicated to the LFUCG. In multi-family residential developments, these facilities shall be owned and maintained by the LFUCG if they are on a separate lot with access to a public street.

The property owner shall own and maintain stormwater Best Management Practices (BMPs) in commercial and industrial developments. The BMPs shall not be subdivided into multiple lots. Furthermore, they shall be connected to at least one building lot, but no more than one building lot.

The purpose of these requirements is to ensure that:

- a citizen, group of citizens, or neighborhood association does not own or maintain a new detention pond or other BMP

- only one corporation or business owns and maintains a detention pond or other BMP

1.4.7 Lot Drainage in Residential Development

Constructed channels shall be provided for drainage areas greater than 1 acre in residential developments. The channel shall be designed to carry the 100-year storm to the stream. The drainage easement along the channel shall be 20 feet wide, or the width of the 100-year flow plus 5 feet on each side, whichever is wider. The Engineer shall design these channels as part of the Improvement Plans. The design criteria are contained in Chapter 8.

Channels in back yards and side yards that receive runoff from a storm sewer or culvert shall have a paved (generally concrete) trickle channel designed to carry 50% of the 1 year storm. The design criteria for the trickle channel are contained in Chapter 8.

1.4.8 Maintenance of Drainage Easements

The LFUCG shall be responsible for maintaining the major structural items in the public drainage system easement. These items include pipes, paved channels, and headwalls. In residential areas, minor maintenance like mowing shall be the responsibility of the property owner. For commercial and industrial areas, the property owner shall be responsible for all maintenance.

Property owners shall not construct anything in the public drainage system, including the waters and post-development floodplains of Fayette County adjoining their property, that will impede the flow of water.

1.4.9 Class C Impoundments

Construction of Class C Impoundments as defined by the Kentucky Division of Water shall be prohibited. Proposed new impoundments shall be evaluated to determine the hazard classification. The evaluation shall be based on fully developed conditions downstream of the structure in accordance with the Comprehensive Plan.

1.4.10 Development Downstream of Existing Impoundments

Impoundments that are classified as Class A (Low Hazard) may sometimes become a Class B or C (Moderate or High Hazard) when vacant land below the impoundment is developed. Class B and Class C impoundments have to meet design standards of the Kentucky Division of Water. These classifications apply to structures that temporarily or permanently hold water. More information on hazard classifications can be found in Chapter 2.

The Developer shall be responsible for making improvements to upstream structures, in accordance with the Kentucky Division of Water criteria, if the proposed development would cause the structure to be reclassified as a Class B or Class C impoundment. The appropriate agreements between the Developer and the owner of the impoundment shall be submitted to the LFUCG. Rather than improve the upstream structure, the Developer may choose to

establish an easement to ensure that the impact area downstream of a failed impoundment is not developed.

1.4.11 Offsite Drainage Problems

Where offsite stormwater problems are known to exist, development projects shall consider these problems and integrate solutions determined through the Watershed Studies discussed above. Development projects shall help mitigate these existing problems. For example, in areas where downstream flooding is known to be a problem, LFUCG may require that peak flows from a new development be less than pre-development peak flows.

1.4.12 Coordination with the National Flood Insurance Program

Construction within the FEMA Special Flood Hazard Area shall comply with Article 19 of the Zoning Ordinance, the requirements of the Commonwealth of Kentucky, and the requirements of the National Flood Insurance Program (44 CFR 59 - 44 CFR 75). For developments that contain the FEMA Special Flood Hazard Area, the Developer shall determine the 1% Annual Chance “Post-developed floodplain” (defined in Section 1.3.3) using the procedures in this manual. For developments containing the FEMA Special Flood Hazard Area, the following minimum requirements shall apply:

- The 1% Annual Chance Special Flood Hazard Area and the 1% Annual Chance Post-Development floodplain shall be shown on the Improvement Plans, Record Drawings, and Plats.
- No construction that would affect the hydrologic or hydraulic characteristics of a flooding source and thus result in the modification of the existing regulatory floodway, the effective base flood elevations, or the Special Flood Hazard Area (SFHA) are permitted unless a CLOMR or a CLOMR-F, is obtained prior to construction (44 CFR 72.1).
- Upon completion of the construction described in the CLOMR or CLOMR-F, the developer must obtain the final LOMR or LOMR-F from FEMA (44 CFR 72.1).
- Any other physical change which may affect flooding conditions must be submitted to FEMA for a Letter of Map Revision (LOMR) within six (6) months of the change being made (44 CFR 65.3).
- The Director of Engineering is the Local Floodplain Administrator. All CLOMR, CLOMR-F, LOMR, LOMR-F and any other applications to FEMA for map changes must be reviewed and signed by the Local Floodplain Administrator before being submitted to FEMA.
- All other provisions of the National Flood Insurance Program, whether, specifically listed above or not, are applicable to all proposed development within Fayette County.
- In the event of conflict between Local, State, and Federal regulations, the more stringent regulation shall govern.

1.4.13 Erosion Control Requirements

The erosion control requirements in Chapter 11 shall apply to all construction activities.

1.5 Water Quantity Criteria for New Development

1.5.1 Quantity Impacts

The runoff from impervious services created by development can result in impacts to property and the aquatic community caused by increases in the rate of flow and volume of water. Aquatic community impacts are addressed in Section 1.6. Impacts to property may occur because of

- flooding from loss of channel capacity caused by sediment deposition
- flooding due to an increase in peak flow from the addition of impervious areas
- flooding due to the capacity of the drainage network being exceeded
- increases in the area subject to flooding

1.5.2 Exemptions from Quantity Controls

Development sites that are part of a regional stormwater master plan are exempted from quantity controls. Other sites are exempted as described below.

1. In general, runoff controls shall not be required if it can be shown by a detailed watershed study that any of the following exists:
 - The construction of detention ponds would have insignificant ($< 0.1'$) effects on reducing downstream flood levels, or
 - Detention ponds are not needed to protect downstream property and the downstream drainage system has sufficient capacity to receive any increase in runoff for the 100-year storm, or
 - Detention ponds are not necessary to control runoff at the exit of a proposed development and constructing such detention ponds would increase flood levels at some point downstream, or
 - The Division of Engineering determines that detention ponds are not needed to control runoff and installing such facilities would not be in the best interest of the LFUCG

Therefore, detention shall not be required for a site if the effect of uncontrolled runoff for the 100-year 1-hour and 100-year 6-hour storms can be shown to have an insignificant effect on water levels on the receiving stream (solid or dashed blue line).

To evaluate the effect on the receiving stream, the Engineer shall conduct a watershed study to determine the flood levels using the 100-year 1-hour and 100-year 6-hour storms. The study area of the receiving stream shall extend downstream to, but no more than, 10 times the area of the proposed development. This means that when the receiving stream combines with another stream, and the combined watershed is more than 10 times the development site area, then the study area shall stop immediately before the confluence with the other stream. The Division of Engineering may conduct this study if their watershed model for that area has been completed.

The study area shall be based on fully developed conditions assuming no detention on any of the remaining parcels of land within the study area. If the cumulative effect of the additional runoff from the undeveloped sites within the study area, without detention, increases the water level less than 0.1' for each storm, then no detention shall be required on the development site in question. If the cumulative effect increases the water level greater than 0.1' for either storm within the study area, no detention shall be required on the site in question if all of the following apply:

- The increase in water level for each storm at the downstream end of the study area is less than 0.1'.
 - The drainage system has sufficient capacity to carry the flow for both storms from the site in question to the receiving stream. Sufficient capacity for a pipe system shall be defined as no overflows at inlets or manholes. Sufficient capacity for an open channel system shall be defined as a drainage easement wide enough to carry the flow.
2. Small “bathtub” detention ponds for small drainage areas are generally ineffective at reducing peak flows because they clog easily. Therefore, small drainage areas shall not be required to have detention ponds if they meet the following conditions:
- a. The drainage area is residential, less than 5 acres in size, and the pipe/open channel drainage system from the site to the blue line stream has sufficient capacity, as defined above, to carry the 100-year storm.
 - b. The drainage area is commercial or industrial, less than 1.0 acres in size, and the pipe/open channel drainage system from the site to the blue line stream has sufficient capacity, as defined above, to carry the 100-year storm.

1.5.3 Peak Flow Design Criteria

Stormwater BMPs shall be designed and constructed to maintain existing peak flows from new development projects. The design storms used for this analysis are contained in Chapter 5. BMPs for controlling peak flows are contained in Chapter 10. The BMPs that can be used for residential and commercial/industrial development are shown in Table 1-1.

TABLE 1- 1
OPTIONS FOR STORMWATER MANAGEMENT

Best Management Practice	Residential Development		Commercial and Industrial Development	
	Quantity	Quality	Quantity	Quality
Bioretention Systems				•
Infiltration Systems				
Downspouts to Grass		•		•
Modular Pavement				•
Swales		•		•
Bermed Swales		•		•
Biofiltration Swales				•
Terraforming				•
Infiltration Basins		•		•
Vegetated Filter Strips				•
Riparian Buffers		•		•
Sand/Organic Filters				•
Prefabricated Treatment Devices				•
Detention Ponds	•		•	
Extended Detention Ponds	•	•	•	•
Wet Ponds	•	•	•	•
Constructed Wetlands	•	•	•	•

1.5.4 Downstream Study Limits

Stormwater facilities for future development shall be designed so that the capacity of the existing and proposed pipes, culverts, channels, and other components of the drainage system are not exceeded. The study limits for a proposed development site shall extend downstream to a point where the drainage area is 10 times the area of the proposed development.

The Engineer shall determine the existing flow capacity of the downstream drainage system impacted by the proposed development if the LFUCG has not conducted such a study. Table 1-2 lists the flow criteria for these drainage system components.

1.5.5 Capacity of the Proposed Drainage System

Storm sewers, inlets, culverts, and constructed channels shall be designed to meet the design criteria in Table 1-2.

1.5.6 Flood Protection Elevation

All residential, commercial, and industrial structures shall be constructed at or above the Flood Protection Elevation. The Flood Protection Elevation (FPE) shall be determined by the Engineer and shall be all of the following

- two feet above the calculated 100-year-post development floodplain elevation, or two feet above the FEMA base flood (100-year) elevation, whichever is higher
- two feet above the 100-year storm elevation in constructed channels
- two feet above the 100-year storm elevation at low points in streets if there is no overflow channel
- two feet above the 100-year, 24-hour storm elevation in detention ponds and wet ponds
- two feet above the embankment crest of detention ponds and wet ponds

TABLE 1- 2
FLOW CRITERIA FOR STORMWATER FACILITIES

Stormwater Appurtenance	Design Storm Criteria	Manual Reference Section
Road Inlets on Grade	Spacing is based on allowable spread of water at a rainfall intensity of 4 inches per hour.	Chapter 6
Road Inlets in Sags	Top of Curb: 10-year Back of Sidewalk: 100-year	Chapter 6
Storm Sewers	10-year and 100-year	Chapter 6
Culverts	100-year	Chapter 7
Constructed Channels	100-year	Chapter 8

1.5.7 Setback from Floodplain

Developments shall be designed so that the wall of any principal or accessory structure can be located a minimum of 25 feet from the 100-year 24-hour post-development floodplain.

1.5.8 Rural Service Area

Developments in the Rural Service Area containing less than 1 acre of directly connected impervious area shall not require water quantity controls, but will require erosion and sediment controls.

1.6 Water Quality Criteria for New Development

1.6.1 Impairment of Uses

The runoff from impervious surfaces created by new development can result in impacts to the water quality of Fayette County. Impairment to aquatic life may occur because of the loss of aquatic habitat caused by

- the destruction of riparian vegetation
- decreases in the base flow during non-runoff periods
- increases in stream bank erosion from higher stages caused by additional runoff volume
- bottom scour from higher velocities through culverts and other conveyance mechanisms
- increased toxicity from the increased chemical content
- the nuisance growth of algae and other aquatic plants resulting from the nutrients in runoff
- decreased light penetration from suspended material
- increases in the sediment deposited on the stream bottom

Impairment to secondary contact recreation uses may result from

- increases in bacteriological content due to small animal wastes
- increases in the presence of petroleum products

Impairment to public water supply uses may result from the

- growth of algae and other nuisance aquatic plants resulting from the nutrients in runoff
- increases in bacteriological content due to small animal wastes
- increases in the presence of petroleum products
- increases in suspended solids resulting in an increased cost of water treatment
- decreases in reservoir water storage capacity resulting from sedimentation

1.6.2 Exemptions from Quality Controls

Development sites that are part of a regional stormwater master plan are exempted from quality controls. Sites less than one acre are also exempted. Water quality BMPs are not required for sites with less than ten percent imperviousness.

1.6.3 Water Quality Volume Criteria

The impact of the increase in the volume of water that becomes runoff rather than infiltration from a development site shall be mitigated through the capture, storage, and release of a volume of water proportional to the amount of impervious area. This volume is referred to as the water quality volume. The procedures for calculating the water quality volume are

contained in Chapter 10. The water quality volume from development projects greater than 1 acre shall be treated using BMPs described in Chapter 10.

The practice of discharging downspouts to grass provides an infiltration volume credit. The use of swales also provides an infiltration credit. These credits are calculated as described in Chapter 10 and can be used to satisfy a portion of the water quality volume. The remaining water quality volume shall be provided in one or more of the BMPs shown in Table 1-1.

For commercial and industrial areas, at least fifty percent of the site shall be treated with bioretention or infiltration. The remaining area shall be treated using one of the options in Table 1-1.

1.6.4 Infiltration Credit for Floodplains

Proposed developments that contain a floodplain shall receive an infiltration credit of 0.5 acre-feet/acre of floodplain. The credit can be used against the required water quality volume.

1.6.5 Culvert Outlet Velocity Criteria

The design velocity at the culvert outlet shall be reduced to match the natural stream velocity in accordance with the BMPs in Chapter 11 and the design procedures in Chapter 7.

1.6.6 Erosion Controls

Non-structural and structural erosion and sediment control BMPs shall be designed and constructed in accordance with an erosion and sediment control plan, as described in Chapter 11.

1.6.7 Rural Service Area

Developments in the Rural Service Area containing less than 1 acre of directly connected impervious area shall not require any water quality BMPs, but will require erosion and sediment controls.

1.7 Stormwater Standards for Redevelopment Projects

1.7.1 Objectives

The objectives of these standards are to (1) demonstrate UCG compliance with federal stormwater quality regulations and (2) prevent causing new flooding problems.

Constructing water quality best management practices (BMPs) on redevelopment sites is typically more difficult and more expensive than on new development sites. To encourage redevelopment, the water quality requirements for redevelopment are less stringent than those for new development. Whereas new development sites must treat 100% of the runoff to meet the water quality requirements in this manual, redevelopment sites must treat a maximum of 20% of the runoff.

Redevelopment projects generally do not increase the impervious area; thus, water quantity BMPs are not required if the impervious area stays the same or is reduced.

1.7.2 Application

The stormwater standards for redevelopment shall apply to preliminary development plans initially submitted to LFUCG on or after January 1, 2005. Stormwater standards for redevelopment shall apply to sites that previously contained structures or parking lots, where one acre or more of land (including buildings and parking lots) will be disturbed. Disturbance is defined as construction that exposes soil; it does not include remodeling or pavement surfacing. Proposed development of infill parcels that never contained buildings or parking lots shall be considered new development. Proposed development of parcels containing a residence where the land use is agricultural shall also be considered new development.

1.7.3 Water Quantity Criteria for Redevelopment

Water quantity BMPs are not required if the impervious area is not increased.

If the impervious area is increased less than 1 acre, water quantity BMPs are not required if the downstream drainage system (to a blue-line stream) has sufficient capacity to carry the 100-year 1-hour and 100-year 6-hour storms (this is intended to prevent the construction of small bathtub detention basins because they are usually ineffective). Sufficient capacity for a pipe system shall be defined as no overflows at inlets or manholes. Sufficient capacity for an open channel system shall be defined as a drainage easement wide enough to carry the flow. If a drainage easement does not exist, sufficient capacity shall be defined as an insignificant (<0.1') rise in the water surface elevation for each storm.

Where required, BMPs shall be implemented to reduce peak flows to January 1, 2004 conditions for the design storms in Chapter 5. A fee in lieu may be allowed as described in Section 1.8.

1.7.4 Water Quality Criteria for Redevelopment

The water quality criteria shall require a 20% reduction in the impervious area that has existed on the site (based on historical maps or other documentation provided by the developer), or implement stormwater quality BMPs for 20% of the site impervious area, or a combination thereof.

A fee in lieu of constructing water quality BMPs may be allowed as described in Section 1.8. It is anticipated that sites less than five acres will pay the fee, and sites of 5 acres or more will construct on-site BMPs.

1.7.5 Erosion and Sediment Control

Erosion and sediment control BMPs shall be installed as described in Chapter 11.

1.8 Fee-In-Lieu for New Development and Redevelopment

Development projects and redevelopment projects are required to control the effects of stormwater runoff, including water quantity and water quality, in accordance with this manual. LFUCG recognizes that constructing on-site best management practices (BMPs) may not be the most effective method for controlling stormwater runoff. Therefore, LFUCG has established a fee-in-lieu of constructing on-site BMPs in such a way to facilitate development and redevelopment, reduce costs for stormwater management, and avoid unnecessary delays for the developer. The fee-in-lieu program is described below:

1. Where water quantity or water quality BMPs are required by this manual, LFUCG may allow the Developer to pay a fee instead of constructing on-site BMPs whenever the Director of the Division of Engineering (Director) determines that on-site BMPs are not the most effective method of controlling stormwater runoff. This includes, but is not limited to, the following situations:
 - a. The Director has reviewed studies and evaluations conducted by the developer and determined that constructing on-site BMPs
 - will not effectively improve water quality
 - will not effectively reduce peak flows
 - is not feasible because of design constraints, such as the inability for a below ground structure to drain by gravity
 - b. Existing downstream homes and businesses that experience structure flooding are being removed from the floodplain by the UCG.
 - c. Flood control or water quality control BMPs are being planned or implemented in the watershed.
 - d. Drainage improvements such as storm sewer replacement or enlargement in the watershed are funded.
2. LFUCG will enter into an agreement with each developer participating in the fee-in-lieu program. Funds collected will be placed in a government account to be used for government water quality projects within or benefiting the watershed from which the funds originated.
3. The Director shall establish the fee for water quantity based on studies and evaluations conducted by the developer.

The fee shall not be applied to the following because water quantity BMPs are not required as explained in previous sections of this manual:

- new development residential sites less than 5 acres if the downstream drainage system has the capacity to carry the 100-year storm

- new development commercial sites less than 1 acre if the downstream drainage system has the capacity to carry the 100-year storm
- redevelopment sites that do not increase the impervious area
- redevelopment sites that increase the impervious area less than 1 acre if the downstream drainage system has the capacity to carry the 100-year storm

4. The fee for water quality shall be based on the table below.

Disturbed Area (acres)	Fee-in-Lieu of Constructing On-Site Water Quality BMPs	
	New Development	Redevelopment
Less than 1.00	Not applicable because water quality BMPs are not required for sites that disturb less than 1 acre	Not applicable because water quality BMPs are not required for sites that disturb less than 1 acre
1.01- 5.00	Determined by the Director based on the developer's cost estimate for constructing BMPs to treat <u>100%</u> of the impervious area, including land costs if applicable.	Determined by the Director based on the developer's cost estimate for constructing BMPs to treat <u>20%</u> of the impervious area, including land costs if applicable.
Greater than 5.00	Generally not applicable. On-site BMPs will typically be required.	Generally not applicable. On-site BMPs will typically be required

1.9 Allowable Uses in the Floodplain

Table 1-3, along with Figures 1-1 and 1-2, show the allowable uses in floodplains.

**TABLE 1- 3
ALLOWABLE USES IN THE FLOODPLAIN**

Activity or Use	Zone 1 Vegetative Buffer Strip	Zone 2 Floodplain	Zone 3 Floodplain Setback
Sediment Ponds	N	Y	Y
Detention Ponds along Perennial Streams	N	Y	Y
Detention Ponds along Intermittent Streams	Y	Y	Y
Constructed Wetlands	Y	Y	Y
Bank Stabilization	Y	Y	Y
Roads Parallel to Stream	N	N	Y
Road Crossing – Perpendicular	Y	Y	Y
Utility Crossing – Perpendicular	Y	Y	Y
Utilities Parallel to the Stream	N	Y	Y
Filling to Create Lots	N	N	Y
Excavation to Lower Flood Levels	N	N	N/A
Principal Structures (Homes, Businesses)	N	N	N
Swimming Pools	N	N	Y
Detached garages and storage buildings	N	N	N
Fences	N	Special Permit	Y
Lawns and gardens	N	Y	Y
Mowing	N	Y	Y
Large Tree removal (diam. > 4 inches)	N	N	Y
Shrub/Small Tree Removal (diam. < 4")	N	Y	Y
Shared Use Paths	N	Y	Y
Parking Lots with Temporary Parking	N	Special Permit	Y
Tennis Courts	N	Special Permit	Y
Park trails, baseball fields, soccer fields	N	Y	Y
Playground Equipment	N	Y	Y
Elevated Parking Garages	N	Special Permit	Y
Greenhouses	N	N	Y
Decks, Gazebos, and Shelters	N	Y	Y
Cellular Phone Towers	N	N	Y
Cellular Phone Tower Fences	N	N	Y
Cellular Phone Tower Buildings	N	N	N

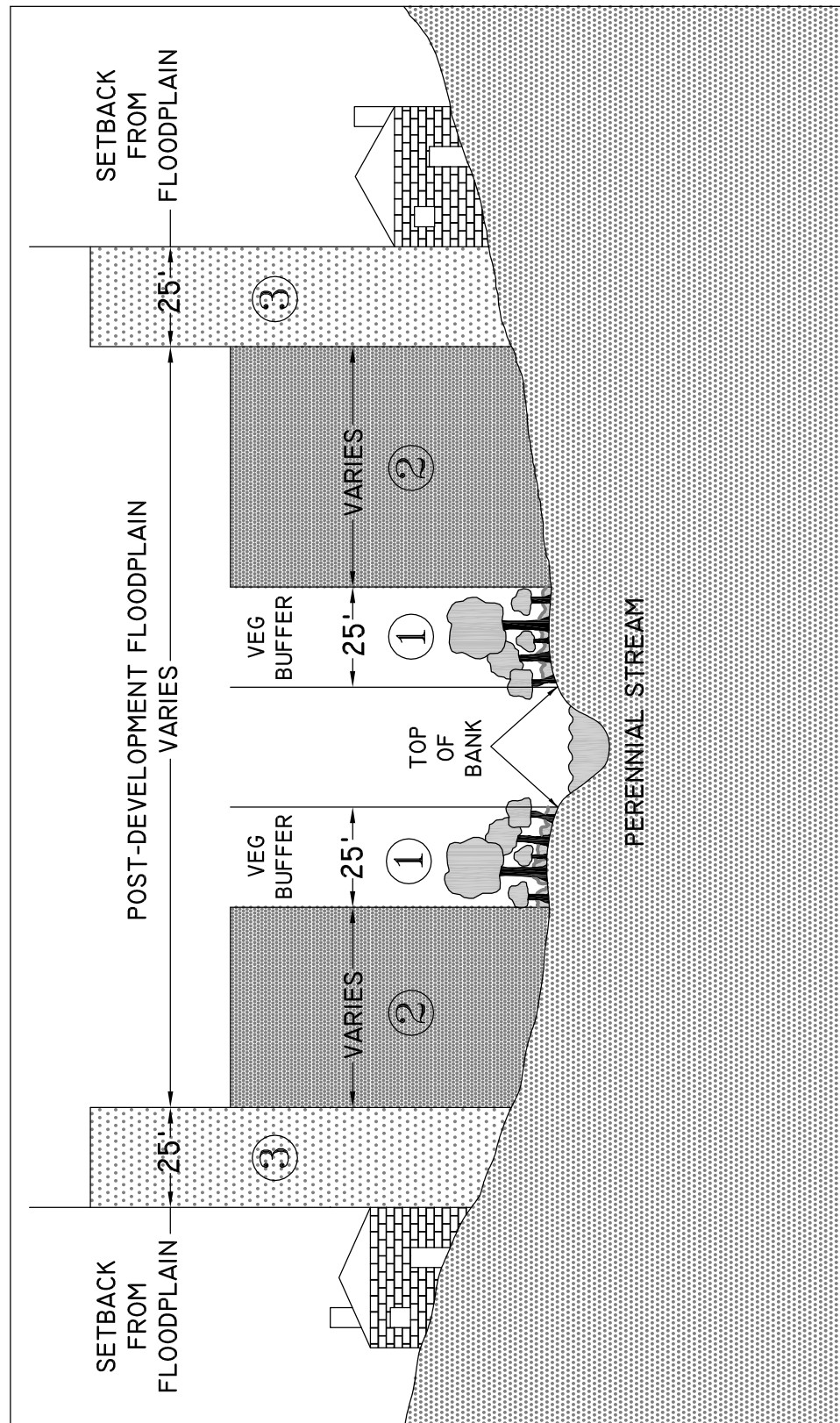


STORMWATER MANUAL

FIGURE 1-1

PERENNIAL STREAM FLOODPLAIN

(EFFECTIVE DATE 1/01/09)





STORMWATER MANUAL

FIGURE 1-2

INTERMITTENT STREAM FLOODPLAIN

(EFFECTIVE DATE 1/01/09)

